

Herring - 1915
DEPARTMENT OF COMMERCE

Pacific States Trading Co.
Glen Cove -

(see Codfish records)

✓ 47,600 # herring, pickled for food
value \$ 2142.⁰⁰

238 lbs.

Slime / used
1 ^{purse} _{semin} - 600

Herring - 1915 -
DEPARTMENT OF COMMERCE

Booth Fisheries Co.

Sitka -

(see ^{at al.} ~~frozen~~ salmon heads)

✓
655,600 # Herring frozen for bait
Value \$1.475 ⁰⁵ ✓

Herring - 1915

DEPARTMENT OF COMMERCE

Marine Products Co.

(subsidiary of Fish Cannery By Products, Ltd)
(see fertilizer & oil file)

Herring, fresh for bait, 61,620 lbs. \$607

" pickled for food, 72,200 " 1,083

361 bbls.

2 purse seines (length 400 fathoms) \$5,000

15 white fishermen employed - wages \$918.14

Herring
DEPARTMENT OF COMMERCE

1 Cetchikan Cold Storage Co.
1 Cetchikan

See ~~Frozen Salmon~~ ^{Habit} Files.

Frozen Herring for bait 207,000[#] - 2,070.⁰⁰

DEPARTMENT OF COMMERCE

Herring.

1915

New England Fish Co
Ketchikan.

(See Halibut files,)

Frozen Herring for bait ✓

949,390 lbs.

valued at

✓
\$ 9,493.70

INQUIRY REGARDING WASTE OF HERRING.

The natives of southeast Alaska are accustomed to collect considerable quantities of herring eggs for food purposes. The eggs being of an adhesive character become attached to algae and other vegetation and to rocks and since they are deposited in shallow water close to shore their collection is a simple matter. To facilitate gathering the eggs the natives supplement the supply of algae or other natural collecting agencies by placing boughs of trees in the water. To ascertain something as to the extent that the use of herring eggs might be considered as having an effect upon the maintenance of the supply of herring an investigation was begun by Mr. E. P. Walker in 1914 and continued in 1915. After the work was undertaken it became apparent that other factors were of greater importance in their bearing on the destruction of herring, and the investigation was accordingly expanded to cover the various important enemies of the herring in southeast Alaska. The matter of suggesting remedies for the evils was also given attention.

The two more important spawning regions for herring in southeast Alaska are in the vicinity of (1) Fish Egg Island, an island lying across the mouth of Klawak Inlet, west coast of Prince of Wales Island and near the village of Craig, and (2) Sitka. The investigation was carried on in both of these regions.

The following extract from Mr. Walker's report is made:

At Craig the herring spawned from March 27th to April 1st inclusive in 1914, and in 1915 from March 10th to the 20th inclusive. The west and north shores of Fish Egg Island with Klawak Reef on the north, form about ninety-five per cent of the spawning ground. These slope quite gradually from high tide level to some distance below low tide level so that a large beach is exposed at low tide. About fifty per cent of the total spawning grounds are thus exposed at every low tide

to the depredations of those enemies operating above the surface of the water. In no place were the eggs found to have been deposited in water more than ten feet in depth at low tide, and from that level to within about two feet of high tide level. Much of this area from about low tide line to a considerable depth is covered with a luxuriant growth of a large-frond species of seaweed. It is upon this and the smaller algae and grasses as well as upon some of the rocks that the eggs naturally adhere. The large fronds, together with the stipes, are frequently many feet in length and float upon the surface of the water or at a comparatively slight depth. Thus their relative position to the surface remains the same at all stages of the tide. But few of these are entirely stranded at low tide so that eggs deposited on them are subject for the most part to disturbance only from those enemies operating in the water. Frequently these large fronds are covered on the upper side to a thickness of one-half inch with the eggs, and it is such as these that the natives select for drying.

When the herring eggs are first deposited they are surrounded by a sticky, gelatinous coating that causes them to adhere to any object they at first touch, and the natives have found that by placing the green branches of hemlock on the beach at low tide where they will be on the spawning grounds when the tide comes in, the eggs will become attached to them, thus making it more easy to collect and dry the eggs as they dry more readily on hemlock than on the seaweed.

The only preparation the eggs undergo for preservation is drying, which is accomplished by hanging the limbs and twigs in trees or on ropes or wires in the sun and wind, and the fronds are either hung over wires or strings or laid on canvas on the ground. A small quantity of eggs on the small moss-like algae is sometimes collected, but owing to the matting down of the mass it dries but slowly and much difficulty is experienced in preserving the eggs. They quickly spoil unless dried rapidly. Also when on this algae they are not so desirable for food.

Practically the entire native population of Klawak, about three hundred, collected eggs at Craig in 1914 and in addition there were natives from Shakan, Hydaburg, Kake, Killisnoo, and many other places. A total of over five hundred natives participated in the work at Fish Egg Island and vicinity. Many of the natives who came in their own power boats lived aboard them, but the entire west shore of the island was lined with the camps of those who had come in canoes or by other means. At the north end of the Island proper is a small village that is only occupied for a short time each year during the period for taking and drying eggs. Most of the natives who had come in canoes were laden down with their spoils when ready to depart and large quantities of both fresh and dried eggs were shipped on the three weekly trips of the mail boat Uncle Dan, plying between Wrangell and the west coast region of Prince of Wales Island. The shipments were consigned to Shakan, Hydaburg, Sulzer, Waterfall, Wrangell, and other points. Many of those who lived at Klawak carried fresh eggs direct to their homes where they dried them. Those who had come from a distance in power boats filled every conceivable bit of space with the fresh and dried eggs and frequently towed canoes, also loaded with the food.

A box filled with fresh eggs on seaweed or hemlock, weighing about fifty pounds, sells for about \$2.00. About half the weight is of the vegetation. All the eggs from a single herring would be but a handful, and when dried but a tablespoonful. The natives who are fortunate enough to be able to take eggs, exert every effort to obtain all they can possibly handle so that they may have plenty to sell and trade to other natives not so fortunate. Thus it is at once apparent that an incredible number of eggs are sacrificed.

At Sitka the conditions were studied in a similar manner and found to be quite similar to those at Craig, except that the spawning grounds are in small isolated coves in the many islands, rocks and reefs of the region; and as the beaches are very steep, a smaller percentage of the eggs were exposed than at Craig and there was no large area covered by spawn as at Craig. The period of spawning in 1914 in the vicinity of Sitka lasted almost three weeks. Operating there were a large portion of the native population of Hoonah, Killisnoo, Kake, and other villages, busily engaged in collecting the eggs and shipping or drying them.

The eggs are shipped in boxes of the size indicated above, or in burlap sacks which hold about the same quantity. On three weekly trips of the steamer Georgia, leaving Sitka on the dates given, the following numbers of packages of eggs were shipped to the places indicated:

Date.	No. of packages.	Destination.
April 1, 1914	1	Chatham
1	12	Killisnoo
1	2	Tenakee
1	12	Hoonah
1	2	Funter
1	7	Douglas
1	20	Juneau.
6	2	Hoonah
6	14	Douglas
12	1	Chatham
12	19	Hoonah
12	3	Haines and Klukwan
12	19	Juneau
Total	114	

This makes a total of 114 boxes and sacks shipped on the three trips of the one steamer. The above figures show an incalculable number of eggs destroyed, but a far greater number were carried away in the boats of the natives who had come from other villages to secure them. Of these there are no figures available, nor is there any way of estimating the

amounts kept in the village and vicinity for future use or the amounts consumed fresh, but on every hand were to be seen both old and young natives devouring the eggs, fresh and cooked. By the natives they are considered a great delicacy, but to the average white person they are wholly insipid. At the Sheldon Jackson school for natives at Sitka the demands for them became so insistent that the management was finally prevailed upon to serve one or more meals of them to satisfy the children.

The fresh eggs are eaten either without cooking of any kind or after having been placed for a few minutes in slightly salted, boiling water. If the eggs have been dried the entire frond or branch is boiled for a few minutes in slightly salted water. In this case the eggs come off and sink to the bottom of the vessel, after which the vegetation is removed by picking out the larger pieces and skimming away the floating trash.

Although the operations of the natives destroy great quantities of herring eggs, their destruction is insignificant in comparison with the natural enemies and the seiners, the destructiveness of both of which is shown in the following portion of this report.

The most destructive of the enemies of the herring are the myriads of water fowl of the region. As the time of spawning approaches and the herring school up in the vicinity of their grounds, these winged hordes congregate in the vicinity in vast flocks, best described as clouds of birds, and remain there the entire time that the herring are about.

The greatest numbers of birds observed or reported were at Craig, which is not far from their breeding grounds. From the time the fish first appear in the region, usually early in the winter, the birds begin to collect. During this time they feed on the adult herring and by the time the herring are ready to spawn many of the migratory birds have arrived to augment the flocks. They prey on these fish from daylight until dark for the entire time and practically without cessation, often becoming so gorged as to be unable to fly; but as soon as the food becomes somewhat digested they are filling themselves again. When they are thus gorging themselves, it is a common sight to see a gull take half a dozen adult herring in as many minutes, if the fish are crowded or confined so as to be unable to escape.

During the spawning season these vast voracious flocks feed almost exclusively on the eggs of the herring. At Craig nineteen birds were collected and their stomachs examined to ascertain the contents. Of these birds there were only three not gorged to their utmost capacity with the eggs from the crop to the pylorus and usually even the mouth was full to overflowing. In only one or two cases were there fish in the stomach and these had probably been picked up dead on the beach when the birds were after eggs. Some of the stomachs contained small quantities of miscellaneous marine matter but this was probably picked up by accident in the search for eggs.

Of the total number of birds in the vicinity of Craig observed to be feeding on the herring or eggs the following are the estimated percentages of the various species;

SPECIES OF BIRDS PREYING ON HERRING.

Species	Percentage each species	Total percentage.
Ducks:		
Surf scooter	15	
White-winged scooter	15	
Old squaw	5	
Miscellaneous	5	40
Gulls:		
Glaucus-winged gull	30	
Bonapartes gull	10	
Miscellaneous	15	55
Shore birds and others		5
Total		100

At Sitka the bird life was much the same except that the relative numbers were somewhat different, the gulls being in still greater majority. Such large flocks were not to be seen here owing to their being scattered over a much greater area, covering many miles of coast-line and intervening waters. Stomachs from seven birds taken here were in practically the same state of engorgement as those taken at Craig and contained about the same class of food material in much the same proportion.

An actual count of the herring eggs contained in the stomach of one unidentified species of gull, probably a Glaucus-winged, gave the surprising number of 5,378 eggs remaining in such a state of preservation as to be easily distinguishable. This stomach was not a fair sample as it was not filled nearly as full as were most of those taken. The average stomach contained at least twice this number of eggs and many held fully three to four times as many. There is no doubt but that a single gull, or other bird of similar size, when feeding on herring spawn will consume at least ten thousand eggs at a single meal. Birds digest their food so rapidly and the herring eggs are so readily digested that the quantities consumed are almost incredible. It is probable that in some cases not less than fifty thousand eggs are consumed in a single day by individual birds, as they eat almost continuously during the daylight hours.

At Fish Egg Island and vicinity about fifty per cent of the eggs are above water at low tide, and of those exposed I have good reason to believe from my observations that not more than five per cent escape destruction by the birds. Of those below water a considerable number are taken by the ducks, grebes, loons, cormorants and others not confined to operations on the surface.

From the time the fish approach the surface at the outer coasts, all during their stay in the inland waters, and until they return to the open ocean they are at no time free from the attacks of these voracious enemies.

It seems desirable to reduce losses from the natural enemies, that man may profit by what is saved from them. To best accomplish this, the most effective and practical remedy that occurs to the writer is to remove completely all protection from the birds that do the damage, save that their nesting sanctuaries might be retained; and at the time of spawning place one or two men well supplied with guns and ammunition to shoot and frighten away the birds from these areas. At such a spawning ground as at Craig it would not be difficult or expensive to protect the eggs quite fully by this means from the ravages of the birds for the few days they are exposed to their depredations before hatching. In such a region as Sitka, and vicinity it would be slightly more difficult and expensive, but not prohibitively so, for the herring in that region do not spawn simultaneously at widely scattered points.

The white man's most direct and needless destruction of the herring is the seining of them on their spawning grounds and vicinity when spawning or about to spawn. This however is much easier to control than any of the preceding. During their spawning period and for some time previous, they are valueless as food for human consumption and are used only for bait or in the manufacture of oil, fertilizer, chicken feed, or similar preparations. At this time they are much less wary than usual and are readily seined in large quantities, particularly for bait for halibut fishing. In any of these operations not only the individual fish are sacrificed but the eggs that are to produce the supply of fish for future years are lost as well. Such destruction can not do otherwise than decimate the numbers of herring when taken in conjunction with the other destructive agencies at work. Frequently when seining is done on the spawning grounds the seine and boat becomes a mass of spawn. Thus not only the herring and the eggs remaining in them are destroyed, but many of the eggs that have already been deposited are ruined.

The freezing and preserving in cold storage of herring for bait is not an expensive or difficult operation, as is shown by the fact that it is at present done to a considerable extent. The taking of herring or the disturbing of their spawn should be prohibited in southeastern Alaska each year from March first to May first. It is during this period that all spawning occurs in southeastern Alaska, so far as the writer has been able to ascertain. At the same time the retention of herring in pots or inclosures for more than five days after

the commencement of the closed season of each year should also be prohibited. Under the present conditions it is not infrequent that during their spawning season thousands of barrels of herring are retained in pots where they deposit their spawn, practically all of which is lost.

The Craig and Sitka regions are the two more important spawning grounds, and represent the two types of grounds, i.e., the single large areas and the many small isolated coves and bights; the former exposing a large percentage of the eggs at low tide, and the latter comparatively few. Besides these grounds, there are about twenty other points at which it is known that herring have at times spawned. Of these a few are regular resorts but the majority are not used annually, and a few only rarely. At all of these grounds the conditions are essentially the same as those of either the Craig or Sitka regions, particularly as regards the natural enemies and the operations of the natives. It is quite probable that more detailed work would develop other spawning grounds.

Under the discussion of the natural enemies and the operations of the seiners, methods have been proposed for remedying the existing conditions, but no comment has been made on the advisability of prohibiting the natives from taking eggs as the other two factors are of so much greater importance in the destruction of the herring that it seems advisable to recommend first the correction of those evils. As was shown under the discussion of the natives' operations, they do destroy considerable quantities of spawn, but, as compared with the natural enemies and the seiners, the natives' work is not of great importance. In the writer's opinion the natives should be prohibited only after provisions are made for checking the ravages of the birds, and the prohibition of seining during March and April of each year.

The Bureau is now giving careful consideration to the formulation of measures having in view the abatement as far as practicable of those agencies which are destructive to the herring fishery.

HERRING FISHERY.

There is no phase of the fisheries of Alaska which seems to have had less attention commercially in proportion to its potential worth than the herring fishery. The waters of Alaska abound with a high grade of herring of a species differing so slightly from that of the Atlantic coast that to the casual observer there is no real difference. Notwithstanding this abundance there has been no development of the commercial fishery in any way approaching the possibilities along this line in Alaska. Herring have been utilized chiefly in three ways: (1) As bait in the halibut fishery, (2) pickled for food, and (3) in the manufacture of oil and fertilizer. There have also been some shipments of dry-salted herring in bulk to the Orient, but prohibitive freight rates have made such ventures unprofitable. The development of the pickled herring trade of Alaska has not been as successful as might have been the case if greater care had been exercised by the fishermen in handling the pack. There has been a disposition not to sort the herring with sufficient care, and the result has been unfavorable to the trade. Most of the herring have been caught by means of purse seines, which has resulted in the taking of all sizes of the fish, but if gill nets of suitable size mesh were used, as is largely the case in the herring fishery in European waters, only the larger sized herring would be caught. This would do away with much of the labor in sorting the fish when preparing them for pickling. It is realized that when herring are taken for halibut bait, either to be sold in a fresh condition or to be frozen for future use, it is more profitable to use purse seines.

On account of the unprecedented demand for herring in Europe, resulting from war conditions, the importations of Norwegian and Holland

herring into the United States fell off in 1915, in consequence of which the market has been strong for American herring. As a result, shipments of pickled herring from Alaska in 1915 were greater than in the previous year, and it is reported that the quality and size of the fish were much improved over that of former years. Under present conditions it is believed that a good grade of Alaska herring running about 600 fish to the barrel should be worth at least \$12 a barrel. Smaller fish, grading down in size to about 1,000 per barrel are worth approximately \$9. The advent of the Pacific Mild-Cure Company, a new concern in the Alaska field, had much to do with improving the pickled-herring industry in 1915. This company's operations were conducted chiefly in the vicinity of Petersburg.

As for many years past, the Alaska Oil and Guano Company conducted its plant at Killisnoo, where herring were utilized in the manufacture of oil and fertilizer. This company has also extended its operations somewhat to include the sale of herring for bait to halibut vessels, and has also pickled some herring for food. The season's catch of herring was upwards of 28,000 barrels. It is likely that before long legislation will be enacted prohibiting the use of herring or other food fish in the manufacture of oil or fertilizer. Should such action be taken a reasonable amount of time ought to be given the company in which to adjust its affairs.

STATISTICAL SUMMARY.

According to the statistics, the herring fishery in Alaska in 1915 shows an increase over the previous year. The total investment in 1915 was \$211,640, as compared with \$203,045 for 1914. The number of persons engaged in 1915 was 158 as against 144 in 1914. The value of the products in 1915 was \$155,579, as compared with \$123,217 in 1914. The most notable

feature of the gain in 1915 was the increased pack of pickled herring for food. There was also a considerable increase in the amount of herring frozen for bait. The production of both oil and fertilizer manufactured from herring declined in 1915.

INVESTMENT IN THE HERRING FISHERY OF ALASKA IN 1915.

Items.	No.	Value.	Items.	No.	Value.
Vessels:			Pile drivers	2	\$1,000
Steamers and launches	4	\$22,000	Purse seines	12	15,000
Tonnage	163	----	Cash Capital	--	90,000
Launches under 5 tons	1	1,500	Shore and		
Bouts, row and seine	22	2,040	accessory property	--	74,000
Lighters and scows	6	6,100			
			Total		211,640

PERSONS ENGAGED IN THE ALASKA HERRING FISHERY IN 1915.

Occupations and races.	Number.
Fishermen:	
Whites	99
Japanese	4
Total	103
Shoresmen:	
Whites	32
Natives	11
Japanese	7
Total	50
Transporters: Whites	5
Grand total	158

PRODUCTS OF ALASKA HERRING FISHERY IN 1915.

Products.		Quantity.	Value.
Herring:			
Fresh, for bait	pounds	2,757,020	\$16,561
Frozen, for bait	"	2,646,390	19,300
Pickled for food a	barrels	8,956	78,238
Fertilizer	tons	619	15,475
Oil	gallons	130,028	26,005
Total		-----	155,579

a. Includes 308 barrels, valued at \$2,457, pickled for food in central Alaska.